We claim:

1. A fuel cell system, comprising:

a fuel cell mixing apparatus into which can be fed a source fuel and a diluting fluid, capable of mixing said source fuel and said diluting fluid together in a desired mixing proportion into a fuel mix, and capable of outputting said fuel mix for feeding to a fuel cell; and

a fuel mix dielectric constant sensor capable of measuring a fuel mix dielectric constant of said fuel mix output from said fuel cell mixing apparatus, thereby enabling actual relative proportions of said source fuel and said diluting fluid within said fuel mix to be determined from said fuel mix dielectric constant; wherein:

the measurement of said fuel mix dielectric constant is used in a feedback loop as a basis to adjust, as needed, said mixing said source fuel and said diluting fluid together, in order to maintain said desired mixing proportion.

2. The system of claim 1, further comprising said fuel cell, wherein said fuel mix is fed to said fuel cell.

3. The system of claim 1, said fuel cell system comprising a direct methanol fuel cell system, said source fuel comprising methanol, and said diluting fluid comprising water.

4. The system of claim 3, wherein said methanol and water are mixed into said fuel mix such that a desired mixing proportion of said methanol within said fuel mix is determined based upon particular technologies used for said fuel call and said fuel cell system.

5. The system of claim 3, wherein said methanol and water are mixed into said fuel mix such that a desired mixing proportion of said methanol within said fuel mix is within a range comprising:

a lower range boundary selected from the lower range boundary group consisting of: 2%, and 1% of said fuel mix; and

an upper range boundary selected from the upper range boundary group consisting of: 5%, 10%, 15%, 30%, 50%, 75%, 90%, and 100% of said fuel mix.

6. The system of claim 3, wherein a desired mixing proportion of said methanol within said fuel mix is approximately 3% of said fuel mix.

7. The system of claim 1, said diluting fluid comprising waste output from said fuel cell.

8. The system of claim 3, said diluting fluid comprising waste water output from said fuel cell.

9. The system of claim 1, further comprising a fuel mix indicator module capable of indicating said actual relative proportions of said source fuel and said diluting fluid within said fuel mix based on said measurement of said fuel mix dielectric constant, in a form accessible to a human.

10. The system of claim 1, further comprising:

a fuel tank dielectric constant sensor capable of measuring a fuel tank dielectric constant of an entire fuel tank of said fuel cell system, thereby enabling relative proportions of a source fuel and an environmental gas within said fuel tank to be determined from said fuel tank dielectric constant irrespective of an orientation and a motion of said fuel tank.

11. The system of claim 10, further comprising:

a fuel tank indicator module capable of indicating how much of said source fuel remains in said fuel tank based on said measurement of said fuel tank dielectric constant, in a form accessible to a human.

12. The system of claim 10, further comprising a dielectric constant measurement control and logic module accepting dielectric constant measurements from both said fuel mix dielectric constant sensor and said fuel tank dielectric constant sensor, and, based on said dielectric constant measurements, causing said mixing said source fuel and said diluting fluid together to be adjusted, and causing the indication of how much of said source fuel remains in said fuel tank to be made.

13. A fuel cell system, comprising:

a fuel tank dielectric constant sensor capable of measuring a fuel tank dielectric constant of an entire fuel tank of said fuel cell system, thereby enabling relative proportions of a source fuel and an environmental gas within said fuel tank to be determined from said fuel tank dielectric constant irrespective of an orientation and a motion of said fuel tank.

14. The system of claim 13, further comprising:

a fuel tank indicator module capable of indicating how much of said source fuel remains in said fuel tank based on said measurement of said fuel tank dielectric constant, in a form accessible to a human.

15. The system of claim 13, said fuel tank dielectric constant sensor comprising a large area capacitor measuring a capacitance

of said entire fuel tank to measure said fuel mix dielectric constant.

16. The system of claim 13, said fuel tank dielectric constant sensor comprising a plurality of dielectric sensors measuring a capacitance of said entire fuel tank to measure said fuel mix dielectric constant.

17. The system of claim 13, wherein:

the measurement of said fuel tank dielectric constant is used as a basis for adding additional source fuel to said fuel tank.

18. The system of claim 17, further comprising:

a source fuel reservoir automatically adding said additional source fuel to said fuel tank in response to said measurement of said fuel tank dielectric constant.

19. The system of claim 13, further comprising:

a telecommunications link, wherein:

a source fuel refill is automatically ordered over said telecommunications link in response to said measurement of said fuel tank dielectric constant.

20. A fuel cell system, comprising:

a telecommunications link for automatically ordering a refill of a source fuel for said fuel cell system, in response to a measurement of how much of said source fuel remains in a fuel tank of said fuel cell system.

21. A method for maintaining a desired mixing proportion of a fuel mix comprising a source fuel and a diluting fluid, capable of being fed to a fuel cell of a fuel cell system, comprising the

steps of:

measuring a fuel mix dielectric constant of said fuel mix, thereby enabling actual relative proportions of said source fuel and said diluting fluid within said fuel mix to be determined from said fuel mix dielectric constant; and

using the measurement of said fuel mix dielectric constant in a feedback loop as a basis to adjust, as needed, a mixing of said source fuel and said diluting fluid together, in order to maintain said desired mixing proportion.

22. The method of claim 21, further comprising the step of feeding said fuel mix to said fuel cell.

23. The method of claim 21, said fuel cell system comprising a direct methanol fuel cell system, said source fuel comprising methanol, and said diluting fluid comprising water.

24. The method of claim 23, further comprising the step of mixing said methanol and water into said fuel mix wherein a desired mixing proportion of said methanol within said fuel mix is determined based upon particular technologies used for said fuel call and said fuel cell system.

25. The method of claim 23, further comprising the step of mixing said methanol and water into said fuel mix wherein a desired mixing proportion of said methanol within said fuel mix is within a range comprising:

a lower range boundary selected from the lower range boundary group consisting of: 2%, and 1% of said fuel mix; and

an upper range boundary selected from the upper range boundary group consisting of: 5%, 10%, 15%, 30%, 50%, 75%, 90%,

and 100% of said fuel mix.

26. The method of claim 23, further comprising the step of mixing said methanol into said fuel mix in a desired mixing proportion of approximately 3% of said fuel mix.

27. The method of claim 21, further comprising the step of supplying at least some of said diluting fluid from waste output from said fuel cell.

28. The method of claim 23, said diluting fluid comprising waste water output from said fuel cell.

29. The method of claim 21, further comprising the step of:

indicating the actual relative proportions of said source fuel and said diluting fluid within said fuel mix based on said measurement of said fuel mix dielectric constant, in a form accessible to a human.

30. The method of claim 21, in combination with a method for maintaining a fuel level in a fuel tank of said fuel cell system irrespective of an orientation and a motion of said fuel tank, further comprising the step of:

measuring a fuel tank dielectric constant of the entire said fuel tank, thereby enabling relative proportions of a source fuel and an environmental gas within said fuel tank to be determined from said fuel tank dielectric constant irrespective of said orientation and said motion of said fuel tank.

31. The method of claim 30, further comprising the step of:

indicating how much of said source fuel remains in said fuel tank based on said measurement of said fuel tank dielectric constant, in a form accessible to a human.

32. The method of claim 30, further comprising the steps of:

accepting dielectric constant measurements of both said fuel mix dielectric constant and said fuel tank dielectric constant using a dielectric constant measurement control and logic module; and

causing the mixing of said source fuel and said diluting fluid together to be adjusted, and also causing the indication of how much of said source fuel remains in said fuel tank to be made, based on said fuel mix and fuel tank dielectric constant measurements, using said dielectric constant measurement control and logic module.

33. A method for maintaining a fuel level in a fuel tank of a fuel cell system irrespective of an orientation and a motion of said fuel tank, comprising the step of:

measuring a fuel tank dielectric constant of the entire said fuel tank, thereby enabling relative proportions of a source fuel and an environmental gas within said fuel tank to be determined from said fuel tank dielectric constant irrespective of said orientation and said motion of said fuel tank.

34. The method of claim 33, further comprising the step of:

indicating how much of said source fuel remains in said fuel tank based on said measurement of said fuel tank dielectric constant, in a form accessible to a human.

35. The method of claim 33, said step of measuring said fuel mix dielectric constant further comprising the step of measuring a capacitance of said entire fuel tank, using a large area capacitor.

36. The method of claim 33, said step of measuring said fuel mix dielectric constant further comprising the step of measuring a capacitance of said entire fuel tank, using a plurality of dielectric sensors.

37. The method of claim 33, further comprising the step of:

using the measurement of said fuel tank dielectric constant as a basis for adding additional source fuel to said fuel tank.

38. The method of claim 37, further comprising the step of:

automatically adding said additional source fuel to said fuel tank in response to said measurement of said fuel tank dielectric constant.

39. The method of claim 33, further comprising the steps of:

automatically ordering a source fuel refill over a telecommunications link of said fuel cell system, in response to said measurement of said fuel tank dielectric constant. constant.

40. A method for maintaining a fuel level in a fuel tank of a fuel cell system, comprising the step of:

automatically ordering a refill of a source fuel for said fuel cell system over a telecommunications link of said fuel cell system, in response to a measurement of how much of said source fuel remains in said fuel tank.